

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

AF/ GP3683 ✓  
Ifw

First Named Inventor: William T. Anderson	Appeal No. ---
Appln. No.: 10/631,905	
Filed : July 31, 2003	Group Art Unit: 3683
For : CAPACITIVE SENSOR FOR DETECTING THE THICKNESS OF AN AUTOMOBILE BRAKE PAD	Examiner: Melanie Torres
Docket No.: R11.12-0780	

**TRANSMITTAL OF APPEAL BRIEF  
(PATENT APPLICATION - 37 C.F.R. §41.37)**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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6<sup>th</sup> DAY OF June, 2005.

  
PATENT ATTORNEY

Sir:

Transmitted herewith is the appeal brief in this application with respect to the notice of appeal filed on March 30, 2005.

The applicant believes that no extension of time is required. However, the applicant conditionally petitions for an extension of time, and authorizes the Director to charge any fees associated therewith to deposit account no. 23-1123, in the event that the applicant has inadvertently overlooked the need for a petition for extension of time and associated fee.

FEE STATUS

The applicant does not claim small entity status under 37 C.F.R. §§ 1.9 and 1.27.

FEE FOR FILING APPEAL BRIEF

Pursuant to 37 C.F.R. §41.20(b)(2) the fee for filing the appeal brief by other than a small entity is \$500.00. A payment of \$500.00 is enclosed.

The Director is authorized to charge any additional fees associated with this paper or credit any overpayment to Deposit Account No. 23-1123.

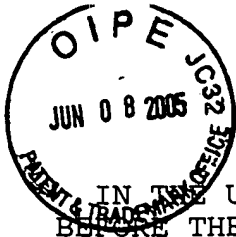
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WESTMAN, CHAMPLIN & KELLY, P.A.

By: 

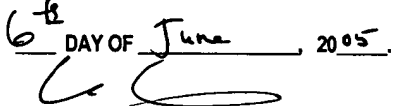
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## BRIEF FOR APPELLANT

Mail Stop Appeal Brief-Patents Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	I HEREBY CERTIFY THAT THIS PAPER IS BEING SENT BY U.S. MAIL, FIRST CLASS, TO THE COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313- 1450, THIS 6 <sup>th</sup> DAY OF June, 2005.  PATENT ATTORNEY
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Sir:

This is an appeal from an Office action dated December 30, 2004 in which claims 1 through 13 were finally rejected. The appellant respectfully submits that claims 1-13 are allowable, and requests that the Board reverse the examiner and find that claims 1-13 are in condition for allowance.

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**REAL PARTY IN INTEREST**

Rosemount Inc., a corporation organized under the laws of the state of Minnesota, and having offices at 12001 Technology Drive, Eden Prairie, Minnesota 55344, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefor, as set forth in the Assignment filed with the patent application and recorded on Reel 014354, Frame 0933.

**NO RELATED APPEALS OR INTERFERENCES**

There are no known related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

**STATUS OF THE CLAIMS**

Claims 1-13 were originally presented. No claims have been added or cancelled. Thus, the pending and rejected claims 1-13 are appealed herein.

**STATUS OF AMENDMENTS**

Appellants filed an amendment after final on March 30, 2005. A responsive advisory action dated April 26, 2005 indicated that the proposed amendment was entered to correct a spelling error in claim 11, but that the rejections are maintained.

## SUMMARY OF CLAIMED SUBJECT MATTER

### 1. Introduction

The present invention pertains to capacative sensors, and particularly to capacative sensors for sensing the thickness of an automobile brake pad.

### 2. Brief Background

Safety is a primary concern for automobile manufacturers. A considerable amount of time, effort, and cost is incurred in order to improve the safety of vehicles. Airbags, seatbelts, anti-lock brakes, and crumple-zones are some of the most notable safety features that have been developed in the last forty years. However, if a car is to have any chance of being safe, it is absolutely necessary that the vehicle be able to come to a stop. Of course, this requires that the car have an adequate braking system.

One component of the braking system is the brake shoes. The principle behind the brake pad is very simple - it provides a source of friction to force the wheels to come to a stop. However, if the brake pads have worn down excessively, it is possible that the brake pad will not work correctly, possibly resulting in expensive damage to the rotors. It is also possible that the pads may fail to bring the car to a stop.

There are two common methods used to indicate brake wear. The first method involves using a different material than the normal pad material. This different material is placed at the backside of the brake pad (away from the rotor). Eventually, after the pad is worn down, this different material begins to come in contact with the brake rotor. This material is designed to create a loud squeaking sound, to indicate to the driver that the brake

pads need to be replaced. Unfortunately, this relies on the ability of the driver to hear the sound. Some drivers may fail to hear this auditory warning, or fail to understand the significance of it. Eventually, this material will wear down as well, at which point the rotor will become damaged and require expensive repairs. Of course, no product can make a driver responsible, nor can a product teach a driver how to properly maintain his/her vehicle; yet it is indeed reasonable to expect that if a driver knows that his/her brakes are bad, then he/she will get them fixed.

Since not all drivers pay attention to the sounds made by the above method, another method has been developed. This method involves using a sensor built into the pads, such that when the brake pad is worn down to a certain point, the sensor is triggered, activating a warning light on the dash of the car. While this approach certainly reduces the chance that the problem will go unnoticed, it does not offer any other insight into the condition of the car's brakes.

Typically, it requires a visual inspection to determine the thickness of the brake pads. Further, it is difficult to know which pad has worn out. It is not uncommon for a car to experience uneven brake wear. For example, in cold climates, it is possible that the slides on one side of the car will freeze up, while the other slides continue to work correctly. This can cause uneven brake pad wear. In fact, it is possible that all but one brake fails to work because the slides have locked up. And, unless the car is inspected, it would be difficult to know that this is occurring. Inspecting the brake pads generally requires that the mechanic remove all tires from the vehicle. Only at that point would it be discovered that uneven wear has occurred.

Therefore, there is a pressing need for a more satisfactory solution for sensing the thickness or application of an automobile brake pad.

### 3.           **The Present Invention**

A capacitive sensor for sensing the thickness of an automobile brake pad is provided. The sensing capacitor includes a pair of parallel plates that are arranged such that brake pad wear reduces the size of one or both of the pads. The reduced size of the plate(s) is detectable as a change in capacitance between the plates. In one aspect a reference capacitor is also placed within the brake pad. The reference capacitor includes a pair of plates that do not change size during wear of the brake pad. The capacitance of the sensing capacitor can be compared to the capacitance of the reference capacitor for a more accurate indication of pad wear.

A method of determining brake pad thickness in a vehicle is also provided. The method includes measuring then capacitance between a pair of capacitive plates. The pair of capacitive plates are disposed in a portion of the brake pad subject to wear. At least one of the pair of capacitive plates becomes smaller as the break pad wears, and in a manner that changes the capacitance between the pair of plates.

#### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

1.           Whether claims 1-13 are unpatentable under 35 U.S.C. 103(a) due to U.S. patent no. 6,384,712 issued to Paielli ("Paielli") in combination with U.S. patent no. 6,366,201 issued to Hanisko ("Hanisko").

#### **GROUPING OF CLAIMS**

The claims do not stand or fall together, but are grouped as follows, and each group is believed to be independently patentable:



- 1.) Claims 1-9;
- 2.) Claim 10; and
- 3.) Claims 11-13.

### ARGUMENT

#### 1. Introduction: Claims 1-13 Should Be Allowed

With this appeal, the appellant respectfully requests that the Board reverse a rejection of claims 1-13 under 35 U.S.C. 103(a). The appellant demonstrates, below, that the references on which the rejection is based do not teach or suggest all elements of claims 1-13. For example, the combined references do not teach or suggest the limitation of a pad portion disposed on the base member as defined by claim 1 of the present invention ("claim 1"). Additionally, claims 1-13 are analogous to a precedent wherein a claim was adjudicated to be unobvious, and meet a corresponding indicia of unobviousness as taught by the M.P.E.P. Furthermore, even if *arguendo* the combined references did teach or suggest all elements of claims 1-13 of the present invention, the references also do not suggest the desirability of combining those elements. For example, the combined references do not demonstrably and objectively suggest the desirability of combining a first pair of capacitive plates disposed in and in contact with a pad portion, wherein the pad portion is disposed on a base member.

The failure of the references to render obvious claims 1-13 of the present invention reflects the genuine inventiveness and valuable new and unobvious advantages conferred by embodiments of the present invention as defined by claims 1-13, which the appellant submits are deserving of allowance. The appellant respectfully implores the Board to find likewise.

## **2. The Present Invention**

As an illustrative embodiment of the present invention, claim 1 defines a brake pad for a vehicle, where the brake pad includes a base member, a pad portion, and a pair of capacitive plates. The pad portion is disposed on the base member, and is constructed from a substantially non-conductive dielectric material. The pair of capacitive plates is disposed in and in contact with the pad portion, and arranged such that wear of the pad portion changes the capacitance between the first pair of capacitive plates.

Claim 1 and claim 11 are the independent claims of the present application. Claims 2-10 are dependent on claim 1. Claim 11 defines a method embodying the present invention. Claims 12-13 are dependent on claim 11.

## **3. The Prior Art References**

Paielli teaches, as representatively disclosed in its abstract:

"A brake wear sensor in which a body of electrical insulating material mounts a pair of electrically conductive plates such that edges of the plates are spaced from each other at a surface of the body. The body has an external thread adapted to be received within an internally threaded opening in a brake pad to position the surface of the body and the edges of the plates adjacent to a braking surface of the brake pad. Electrical circuitry is connected to the plates for monitoring wear at the surface of the body as a function of changes in capacitance between the plates, and a gauge is coupled to the circuitry for indicating brake wear as a function of changes in capacitance."

Paielli teaches certain variations on this theme, including the options of "either flat parallel plates or concentric spiral plates"<sup>1</sup>, and options where the "insulating material may comprise a portion of the insulating body molded between the plates, or separate dielectric material positioned between the plates prior to molding the plates into the body."<sup>2</sup> Different options for associated electrical circuitry are also disclosed.

However, one feature that remains constant throughout the embodiments taught by Paielli is the at least partially insulating body, which envelops the capacitor sensor and is mounted within the brake pad. This insulating body is indicated by reference number 22 in figures 1, 2, 5 and 7, and by reference number 22a in figure 3. (Reference number 22a in figure 4 appears to indicate one of the spiral plates of the capacitor.)

Hanisko teaches a resistor array for progressively detecting brake lining wear, although the examiner cited Hanisko merely to show "a brake pad for a vehicle comprising a base member (15)."<sup>3</sup> Indeed, the base member element, the only feature of Hanisko referenced by the examiner, appears in figure 2 of Hanisko, which is described in the specification of Hanisko to depict a "generic brake drum arrangement" that "is well known in the art."<sup>4</sup>

#### **4. The Rejection Of Claims 1-13**

The examiner rejected claims 1-13 under 35 U.S.C 103(a) under the combination of Paielli and Hanisko. The examiner asserted that Paielli teaches all elements of claims 1-13, except for the element of a base member; that Hanisko teaches a brake

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<sup>1</sup> Paielli, e.g. col. 1 lines 34-35

<sup>2</sup> Paielli, e.g. col. 1 lines 36-39

<sup>3</sup> Office action of Dec. 30, 2004, p. 2

pad for a vehicle comprising a base member; and that it would have been obvious to a person of ordinary skill in the art at the time the invention was made, to combine the base member element of Hanisko with the subject matter of Paielli as being well known in the art.<sup>5</sup>

In order to make this rejection under §103, the examiner interpreted Paielli's element of an insulating body around the capacitors as teaching the element of a pad portion of a brake pad, as defined in claim 1 of the present invention. In particular, the examiner stated, "The insulative material is broadly readable by the examiner as a portion of the pad which and is [sic] subject to wear and in contact with the capacitive plates."<sup>6</sup>

**5. Claim 1 Should Be Allowed: The References Do Not Teach Every Element Of Claim 1**

To sustain the finding of obviousness, the examiner had to interpret the electrical insulating material of Paielli as a pad portion comprised in a brake pad, such that the pad portion could be disposed on a base member (in light of Hanisko); and such that a pair of capacitive plates could be disposed in and in contact with the pad portion, in accordance with how claim 1 defines this element, and along with the further limitations defined by claim 1. However, the electrical insulating material of Paielli is not disposed on a base member, nor does Paielli disclose a base member, as the examiner acknowledged.<sup>7</sup> Instead, the examiner called upon Hanisko in combination with Paielli, purporting that Hanisko teaches a brake pad for a vehicle comprising a base member, and that it "would have been obvious to

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<sup>4</sup> Hanisko, col. 3, lines 53-54

<sup>5</sup> Office action of Dec. 30, 2004, pp. 2-3

<sup>6</sup> Office action of Dec. 30, 2004, p. 3

one of ordinary skill in the art at the time the invention was made to have included a base member in the invention of Paielli to provide additional support of the brake lining as is well known in the art."<sup>8</sup>

When the pad portion element of claim 1 is seen as it is defined by the limitations of claim 1, it becomes apparent that such a pad portion element is not disclosed or suggested in Paielli, and therefore not disclosed or suggested in the cited references. The Paielli reference teaches mounting capacitive plates within a body, made of insulating material (e.g. plastic), and inserting the insulating body into the brake pad. This is accomplished by drilling a hole in the brake pad and threading the insulating body 22 containing the capacitive plates into the internally threaded opening 44 in the brake pad 42. Hence, the capacitive plates are in contact with the insulating body and not with the brake pad.

However, the examiner defined the insulating element of Paielli as a disclosure of a pad portion of a brake pad as in claim 1. This is an arbitrary redefinition of the "pad portion" defined by claim 1, since it would be considered alien for someone of ordinary skill in the art to refer to the insulating body of Paielli as a pad portion of a brake pad. Apparently relying on this arbitrary redefinition, the examiner purported that the insulating body of Paielli could be read within a broadly sweeping definition of a pad portion. However, claim 1 further defines the pad portion as an element that both has a pair of capacitive plates disposed in and in contact with the pad portion, and is disposed on a base member. These separate limitations constrain the definition of the pad portion element of claim 1, to a scope that is incompatible with the interpretation found in the Office action. When the elements of

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<sup>7</sup> Office action of Dec. 30, 2004, p. 2

<sup>8</sup> Office action of Dec. 30, 2004, pp. 2-3.

claim 1 are understood in accordance with how they are defined, there is simply no element disclosed by Paielli that anticipates the pad portion element defined by claim 1 of the present invention. Therefore, the cited references do not disclose every limitation of claim 1, and do not therefore render claim 1 obvious.

The failure of Paielli to disclose the pad portion element of claim 1 is further confirmed by additional language of Paielli. For example, claim 1 of Paielli specifically recites the limitation of "said body [i.e. the insulating body] including means for mounting said body to a brake pad..." (Although what is claimed as opposed to merely disclosed within a prior art patent is immaterial to evaluating the entire disclosure for prior art, this particular claim language of Paielli is representative of the disclosure of Paielli.) By defining the insulating body to include means for mounting the insulating body to a brake pad, Paielli defines the insulating body to be separate and distinct from the brake pad, and something that itself is not the brake pad. This interpretation is used consistently throughout the disclosure of Paielli; nowhere in Paielli does the disclosure teach that the insulating body is a brake pad or part of a brake pad. The teaching of Paielli is therefore distinct and incompatible with the subject matter of the appellant's claim 1. Those of ordinary skill in the art would accordingly have understood the disclosure of Paielli to teach an insulating body separate and distinct from the brake pad. Only with the benefit of hindsight after learning the disclosure of the present invention, might someone have been prompted to try to identify the insulating body of Paielli as itself a pad portion of a brake pad.

Furthermore, even if, *arguendo*, Paielli had not specifically described the insulating body as separate and distinct from the brake pad, there is no good reason why a person

of ordinary skill in the relevant art would have interpreted the insulating body as part of the brake pad. The insulating body does not resemble a brake pad, and is not disclosed to perform, any more than incidentally at most, the function of a brake pad. Rather, the insulating body and the brake pad of Paielli are of different compositions, and perform different functions. The insulating material is described as performing the function of mounting a pair of spaced-apart electrically conductive plates, while the brake pad is described as performing the function of having a braking surface opposed to a brake rotor. There is no hint in the disclosure of Paielli that there is any commonality in the composition of the insulating body and the brake pad, or that the brake pad is in any way disclosed to have a pair of capacitive plates disposed in and in contact therewith.

Therefore, there is no justification for an attempt to conflate the separate and distinct insulating body and brake pad components in Paielli such that the insulating body should become arbitrarily redefined as "a portion of the pad"<sup>9</sup>. Paielli simply does not teach the element of a pad portion that can be both disposed on a base member and have a pair of capacitive plates disposed therein, or as the pad portion element is otherwise defined by claim 1. The cited references therefore do not teach every element of claim 1.

Obviousness under §103 requires that every element of a claim be disclosed in prior art references. Since the cited references do not teach every element of claim 1, claim 1 is not rendered obvious by the cited references under §103. Since claims 2-9 all depend on claim 1 and share the same limitations, claims 2-9 are also not anticipated by the cited references under §103.

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<sup>9</sup> Office action of Dec. 30, 2004, p. 3

**6. Claim 1 Should Be Allowed: Claim 1 Is Comparable To A Claim Adjudicated To Be Unobvious**

The rejection was based on the rationale that the insulating material of Paielli can be interpreted "as a portion of the pad..." In this interpretation then, Paielli discloses an insulating material portion, in addition to a brake pad within which the insulative material portion is received, such that in view of Hanisko, these components together render obvious "a pad portion disposed on the base member" as in claim 1. In other words, the interpretation on which the rejection is based alleges that the single pad portion component of claim 1 performs the functions that are performed or suggested by several distinct components of the cited references.

This is analogous to a §103 rejection that was overturned in In re Edge, 149 USPQ 556 (CCPA 1966) (Rich, J.). In that case, the omission of one of two components taught by the prior art reference, while retaining the function of both components in a single remaining component of the claimed invention, was found to be unobvious. The M.P.E.P. cites this case for the proposition that "Omission of an element and retention of its function is an indicia of unobviousness." M.P.E.P. 2144.04(II)(B).

In the interpretation proffered in the Office action, the rejection of claim 1 is built on the premise that prior art references that teach or suggest two separate and distinct components render obvious a single element of claim 1 that retains the function of both of the separate and distinct components of the cited references. Assuming *arguendo* that the pad portion of claim 1 can be interpreted as a single element analogous to the combined elements of the insulating body and the brake pad of Paielli, that single pad portion element of claim 1 performs the function of both of those elements of Paielli - and



in fact offers superior performance in the single element of claim 1 than the performance offered by a combination of elements in Paielli and Hanisko. The rationale of several elements from Paielli rendering obvious a single element of claim 1 is therefore contrary to the guidance of the M.P.E.P., and contrary to the legal precedent established with In re Edge. Claim 1 should therefore be found unobvious over the cited references.

Furthermore, given the *arguendo* interpretation above, claim 1 not only retains the functions of separate elements in a single element, it also improves on and provides superior function in a single element than the function of the separate elements in the cited references. If the Edge court found unobviousness where the same function was performed by fewer elements, then a *fortiori* an invention offering superior function with fewer elements must be unobvious.

There is substantial evidence of the superior function of the pad portion element of claim 1 vis-à-vis the separate components of the cited references. For example, with all other design specifications being equal, the invention of claim 1 has a greater area of brake pad surface than the device of the cited references, and therefore a greater capability to exert friction against a brake rotor and correspondingly superior braking performance. Paielli teaches removing brake pad material during the drilling process, which must necessarily reduce the surface area of the brake pad. This hole in the brake pad is filled largely with the insulating body, e.g. a plastic housing which houses a capacitor, in the teaching of Paielli. The surface area taken up by this plastic housing is unnecessary for the function of the capacitor, and does not contribute meaningfully to the braking function of the brake pad, by anything indicated in the disclosure. Rather, this surface area lost from the brake pad to the insulating body is detrimental to the braking performance of

the brake pad. The insulating body of Paielli therefore directly contradicts the function of a brake pad.

In contrast, in the present invention as defined by claim 1, the capacitive plates are mounted directly in, and in contact with, the brake pad. A very small surface area of the brake pad is given over to the capacitors, but a small fraction of the surface area lost according to the teaching of Paielli, and no more than the capacitors need to perform their function. The present invention as embodied by claim 1 therefore provides formidable performance advantages, of which a person of ordinary skill in the art at the time the invention was made, armed with the Paielli and Hanisko references, would not have been in possession.

As a further example of superior function, the invention of claim 1 requires fewer pieces and manufacturing steps, and is therefore likely to be significantly less expensive to manufacture than an otherwise analogously performing device of the cited references. With a single, integral brake pad portion where Paielli teaches a separate insulating body mounted into a brake pad, the invention of claim 1 avoids the likelihood with the Paielli device of accumulating dirt or oil in the cavity between the insulating body and brake pad, of the insulating body not being installed correctly in the brake pad, of the brake pad becoming damaged during the effort to drill out the specified internal opening thereof, or of the insulating body eventually coming loose or falling out of the brake pad and potentially interfering with the brake.

There is therefore substantial evidence that claim 1 defines a single component that not only retains the function of separate components taught by the prior art, but furthermore achieves superior function with a single component than the function of the separate components taught by the prior art. The single element retaining the function of separate prior art

elements is an indicia of unobviousness according to the precedent of In re Edge, and as memorialized in M.P.E.P. 2144.04(II)(B). And if retaining the function in a single element is an indicia of unobviousness, a superior function in a single element must be all the more assuredly unobvious, under an *fortiori* consideration of the Edge rule. Claim 1 should therefore be found unobvious over the cited references.

**7. Claim 1 Should Be Allowed: There Was No Suggestion Of The Desirability To Combine Elements Of The Cited References**

The cited references do not teach or suggest all the limitations of claim 1; and the precedent of In re Edge further indicates that claim 1 is not obvious. Even beyond these rationales for the unobviousness of claim 1, claim 1 is further not obvious because the cited references do not suggest the desirability of combining the references.

For claim 1 to have been obvious, a person of ordinary skill in the art at the time the invention was conceived must have had a motivation to combine the elements from the Paielli and Hanisko references, as demonstrated by a factual inquiry of objective evidence, based on specific findings of fact. In re Lee, 61 USPQ2d 1430 (Fed. Cir. 2002). On the other hand, motivation cannot be resolved on subjective belief and unknown authority. Id.

The only apparent suggested motivation to combine provided in the Office action is found at the very end of the statement, "It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a base member in the invention of Paielli to provide additional

support of the brake lining as is well known in the art."<sup>10</sup> This constitutes an assertion followed by a rationale, the assertion being that "It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a base member in the invention of Paielli to provide additional support of the brake lining", and the rationale being "as is well known in the art."

The question here is not whether it would have been well known in the art to dispose a brake lining on a base member; the question is, rather, whether it would have been well known in the art to dispose the pad portion element of claim 1, as defined by the language of claim 1, on a base member. As defined by claim 1, the pad portion element is configured both to be disposed on a base member, and for a pair of capacitive plates to be disposed in and in contact with the pad portion, and as further defined by the language of claim 1.

In the Office action, this evaluation is effectively short-circuited by equating the pad portion element of claim 1 to a brake lining, and then concluding that it was well known in the art to dispose a brake lining on a base member. However, this characterization arbitrarily redefines inventive elements of claim 1 into an uninventive component that contradicts how those elements of claim 1 are defined.

Instead of this straw man approach, motivation to combine must be evaluated based on the actual teachings of the cited references. Specifically, Paielli teaches an element of an insulating body in which a pair of electrically conductive plates are mounted. Paielli also teaches a separate element of a brake pad in which the insulating body is adapted to be received. The insulating body is the only element of Paielli that has electrically conductive plates mounted in it, and that therefore might be used to try to show a prior art teaching at least of a

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<sup>10</sup> Office action of Dec. 30, 2004, pp. 2-3

pad portion having a pair of capacitive plates disposed in and in contact with the pad portion (ignoring for a moment other defining elements of claim 1). So, if there were to be motivation to combine elements between Paielli and Hanisko to render claim 1 obvious, it would have to include a motivation to form a functioning combination of the insulating body of Paielli with the "generic drum brake arrangement"<sup>11</sup> of Hanisko in which brake linings are mounted to a brake shoe, characterized by the examiner as a brake pad for a vehicle comprising a brake member.<sup>12</sup>

Yet, the insulating body of Paielli is described in terms of a fairly small, cylindrical body with external threading, composed for example of plastic. The rationale of the Office action requires it to have been well known in the art to dispose such a small, cylindrical, threaded, plastic insulating body as taught by Paielli, onto a base member of a brake pad. This is an implausible assertion that should require significant evidence if it is to be supported. Instead, the teaching of Paielli is simply dubbed a "brake lining" in the Office action, ignoring the defining features of Paielli or claim 1 and the fatal defects those defining features bring to bear on the rationale presented therein.

This rationale would not work any better if it were argued that the brake pad of Paielli, or the combined brake pad and insulating member of Paielli, were assumed to constitute the "brake lining" that might be combined with the base member of Hanisko as allegedly well known in the art. The brake pad of Paielli by itself simply does not include inventive elements of claim 1 such as a first pair of capacitive plates disposed in and in contact with the pad portion. The combined brake pad and insulating body of Paielli, on the other hand, are a combination

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<sup>11</sup> Hanisko, col. 3, lines 51-54

<sup>12</sup> Office action of Dec. 30, 2004, p. 2

of elements that are substantially different from the pad portion element as defined by claim 1, and reintroduce the indication of unobviousness from the precedent of In re Edge, as laid out above.

The purported motivation to combine in the Office action must also be measured against whether it supplies a motivation that is demonstrated by a factual inquiry of objective evidence, based on specific findings of fact, or whether it is resolved on subjective belief and unknown authority. Again, that stated source of motivation was given with the mere seven words, "as is well known in the art." It is inescapable to conclude that this raw assertion better qualifies as subjective belief and unknown authority, rather than a demonstration by a factual inquiry of objective evidence based on specific findings of fact. It is indeed difficult to imagine a phrasing that would better qualify as subjective belief and unknown authority, as opposed to a demonstration by a factual inquiry of objective evidence based on specific findings of fact, than the bald assertion "as is well known in the art", when the facts render such an assertion anything but certain. Therefore, there has simply not been a showing of any motivation or suggestion to combine the elements from the cited references in a way that would render obvious claim 1 of the present invention.

The appellant therefore submits that claim 1 is not obvious in view of the cited references, for each of the independent rationales provided above, and respectfully requests that claim 1 be allowed.

#### **8. Claims 2-9 Should Be Allowed**

Claims 2-9 are all dependent on claim 1, and thereby share in all the limitations of claim 1, along with further limitations. Therefore, claims 2-9 are each not obvious under §103

in view of the cited references, at the very least, for the rationales provided above pertaining to claim 1.

The appellant therefore submits that claims 2-9 are not obvious in view of the cited references, and respectfully requests that claims 2-9 be allowed.

**9. Claim 10 Should Be Allowed**

Claim 10 is also dependent on claim 1, and thereby shares in all the limitations of claim 1, along with further limitations. Therefore, claim 10 is not obvious under §103 in view of the cited references, at the very least, for the rationales provided above pertaining to claim 1.

Claim 10 is also not rendered obvious by the cited references due separately to elements unique to claim 10, and therefore is not obvious regardless of the rationales for the unobviousness of claim 1.

In particular, claim 10 recites a feature wherein contact between at least one of the plates and a rotor is indicative of brake pad function. As a result, each brake pad may be independently analyzed to determine if it is functioning correctly, as described in the appellant's specification. The appellant submits that this feature is neither taught nor suggested by Paielli. Nor was this separate element of claim 10 ever addressed in the Office action. Instead, the examiner simply grouped claim 10 in bulk with claims 7-10 in a single sentence of explanation for all four of these claims, without mentioning anything of the content specific to claim 10 alone. In particular, the examiner asserted, "Re claims 7-10, Paielli teaches wherein a second pair of capacitance plates (C3, C4) disposed within the pad portion [sic] and arranged such that capacitance between the

second pair does not change with wear of the pad portion. (Column 3, lines 30-38)"<sup>13</sup>

This assertion does not address or make any mention of the subject matter of claim 10; nor is the subject matter of claim 10 taught or suggested by Paielli and/or Hanisko. Since no specific rationale for the obviousness of claim 10 has been made, or is apparent from the cited references, the appellant does not perceive any valid basis for the allegation of obviousness of claim 10.

The appellant therefore submits that claim 10 is not obvious in view of the cited references, and respectfully requests that claim 10 be allowed.

**10. Claims 11-13 Should Be Allowed**

Claim 11 is an independent claim for a method embodiment of the present invention. The Office action includes no separate discussion of claims 11-13, including them only in a general omnibus explanation for the rejection of all of claims 1-13 under §103. The limitations of claim 11 are analogous to those of claim 1, though in the form of a method embodiment rather than a device embodiment. Claim 11 is therefore unobvious over the cited references at least for the same rationales as laid out above for claim 1. Additionally, there is no indication in the Office action of the cited references teaching a method comprising all the steps of claim 11. Therefore, claim 11 is believed to be independently unobvious because no showing has been made of a prior art method disclosing the method or the steps thereof defined by claim 11.

Claims 12-13 are dependent on claim 11, and thereby share in all the limitations of claim 11, along with further

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<sup>13</sup> Office action of Dec. 30, 2004, p. 3



limitations. Therefore, claims 11-13 are each not obvious under §103 in view of the cited references.

The appellant therefore submits that claims 11-13 are not obvious in view of the cited references, and respectfully requests that claims 11-13 be allowed.

#### CONCLUSION

In conclusion, the appellant respectfully submits that claims 1-9, claim 10, and claims 11-13 are allowable over Paielli and Hanisko for at least the several respective rationales laid out above. Thus, the appellant respectfully requests that the Board reverse the examiner and find that claims 1-13 are in condition for allowance.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: 

Christopher R. Christenson, Reg. No. 42,413  
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Appendix A: Claims On Appeal

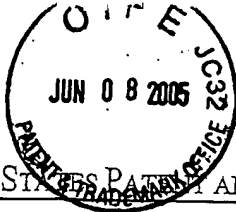
Claims as they currently stand:

1. A brake pad for a vehicle, the brake pad comprising:  
a base member;  
a pad portion disposed on the base member, the pad portion being constructed from a substantially non-conductive dielectric material; and  
a first pair of capacitive plates disposed in and in contact with the pad portion and arranged such that wear of the pad portion changes the capacitance between the first pair of capacitive plates.
2. The brake pad of claim 1, wherein the pad portion is adapted to contact a drum rotor.
3. The brake pad of claim 1, wherein the pad portion is adapted to contact a disc rotor.
4. The brake pad of claim 1, wherein the first pair of capacitance plates are parallel to one another.
5. The brake pad of claim 1, wherein the first pair of capacitance plates are parallel to a direction of wear.
6. The brake pad of claim 5, wherein the first pair of capacitance plates are parallel to one another.
7. The brake pad of claim 1, and further comprising a second pair of capacitance plates disposed within the pad portion and arranged such that capacitance between the second pair does not change with wear of the pad portion.

8. The brake pad of claim 7, wherein wear of the pad portion is a function of the capacitance of the first pair of plates and the capacitance of the second pair of plates.
9. The brake pad of claim 8, wherein the function is the related to the quotient of the capacitance of the first pair of plates over the capacitance of the second pair of plates.
10. The brake pad of claim 1, wherein contact between at least one of the plates and a rotor is indicative of brake pad function.
11. A method of determining brake pad thickness in a vehicle, the method comprising:  
measuring a capacitance between a pair of capacitive plates;  
wherein the pair of capacitive plates are disposed in and in contact with a portion of the brake pad subject to wear,  
and  
wherein at least one of the pair of capacitive plates becomes smaller as the brake pad wears, and in a manner that changes the capacitance between the pair of plates.
12. The method of claim 11, wherein the method is performed by an electronic control unit of the vehicle.
13. The method of claim 11, wherein the method is performed by a technician.

**Appendix B: Evidence**

1. Office action of December 30, 2004
2. U.S. patent no. 6,384,721 issued to Paielli
3. U.S. patent no. 6,366,201 issued to Hanisko

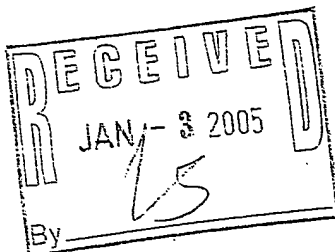


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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/631,905	07/31/2003	William T. Anderson	R11.12-0780	9612

7590 12/30/2004  
Christopher R. Christenson  
Westman, Champlin & Kelly  
Suite 1600  
900 Second Avenue South  
Minneapolis, MN 55402-3319



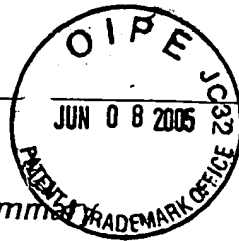
EXAMINER  
TORRES, MELANIE

ART UNIT 3683  
PAPER NUMBER

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

DOCKETED	2-28-05
RESPONSE DUE	3-30-05
CALENDARED	3-30-05
CHECKED BY ATT	6-30-05



# Office Action Summary

Application No.

10/631,905

Applicant(s)

ANDERSON, WILLIAM T. *ST*

Examiner

Melanie Torres

Art Unit

3683

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_



# Notice of References Cited

Application/Control No.

10/631,905

Applicant(s)/Patent Under  
Reexamination  
ANDERSON, WILLIAM T.

Examiner

Melanie Torres

Art Unit

3683

Page 1 of 1

## U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,366,201 B1	04-2002	Hanisko, John Cyril P.	340/454
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

## FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

## NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities:

The title on the Abstract page above "Abstract of the Disclosure" should be removed.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paielli in view of Hanisko.

Re claims 1-13, Paielli teaches a brake pad for an vehicle, the brake pad comprising: a pad portion (42) disposed on the base member, the pad portion being constructed from a substantially non-conductive dielectric material; and first pair of capacitive plates (24, 26) disposed in the pad portion and arranged such that wear of the pad portion changes the capacitance between the first pair of capacitive plates. However, Paielli does not teach a base member. Hanisko teaches a brake pad for a vehicle comprising a base member (15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a base member in



the invention of Paielli to provide additional support of the brake lining as is well known in the art.

Re claims 2 and 3, Paielli teaches wherein the pad portion is adapted to contact either a drum rotor or a disc rotor. (Column 2, lines 49-55)

Re claims 7-10, Paielli teaches wherein a second pair of capacitance plates (C3, C4) disposed within the pad portion and arranged such that capacitance between the second pair does not change with wear of the pad portion. (Column 3, lines 30-38)

### ***Response to Arguments***

4. Applicant's arguments filed September 20, 2004 have been fully considered but they are not persuasive. The insulative material is broadly readable by the examiner as a portion of the pad which and is subject to wear and in contact with the capacitive plates. Therefore, the rejection above is maintained.

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Torres whose telephone number is (703)305-0293. The examiner can normally be reached on Monday-Friday, 6:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bucci can be reached on (703)308-3668. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 10/631,905  
Art Unit: 3683

Page 5

MT  
December 23, 2004

*Robert A. Siconolfi* 12/27/04  
ROBERT A. SICONOLFI  
PATENT EXAMINER